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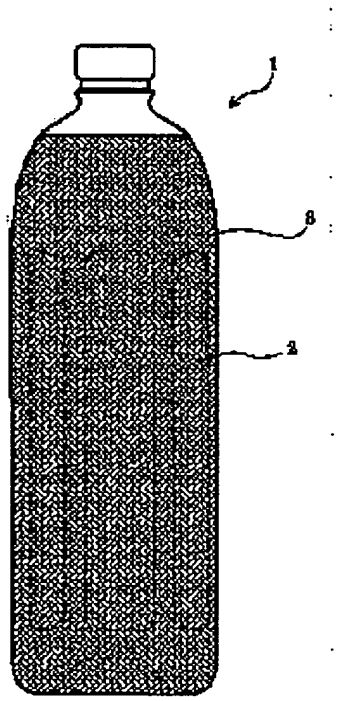
(54) PLASTIC CONTAINER

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a plastic container at a low cost, which prevents contents from being deteriorated by air dragged into a space between each recess formed in the surface of the container and a label stuck thereon, in the case of a plastic container provided with recesses in the surface thereof and a label stuck thereon, and which enables the label to be simply peeled from the used plastic container for recycling the empty plastic container.

SOLUTION: In the case of the plastic container having recesses in the surface thereof, a label having a gas barrier resin layer and an oxygen-absorbing resin layer, which is provided inside the gas barrier resin layer, is stuck on the container so as to cover at least the entire portions of the recesses formed in the surface of the container.



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CLAIMS

[Claim(s)]
[Claim 1]A plastic container characterized by equipping with a label which has a gas-barrier-property resin layer and the oxygen uptake nature resin layer provided in the inside so that this whole crevice of a container surface may be covered at least in a plastic container which has a crevice on the surface.
[Claim 2]The plastic container according to claim 1, wherein an oxygen uptake nature resin layer is constituted with thermoplastics containing an oxygen absorbent.
[Claim 3]The plastic container according to claim 1, wherein an oxygen uptake nature resin layer consists of resin which has oxygen uptake ability.
[Claim 4]The plastic container according to any one of claims 1 to 3, wherein a label is a multilayer-structure object which has an oxygen uptake nature resin layer, a gas-barrier-property resin layer, and a surface protection layer.
[Claim 5]The plastic container according to any one of claims 1 to 4, wherein a label is a shrink label which has a surface protection layer which has an oxygen uptake nature resin layer, a gas-barrier-property resin layer, and heat-sealing nature which have heat-sealing nature.
[Claim 6]The plastic container according to any one of claims 1 to 5 making an adhesives layer intervene between a label and a container surface.
[Claim 7]The plastic container according to claim 6 in which adhesive strength of a label and adhesives is characterized by being larger than adhesive strength of a container surface and adhesives.
[Claim 8]The plastic container according to any one of claims 1 to 7, wherein a label forms a peelable means.
[Claim 9]The plastic container according to any one of claims 1 to 8, wherein specific gravity of the whole label is less than one.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to plastic containers, such as a plastic bottle which has a crevice on the surface.
In particular, it excels in the preservability of contents, and a label is easily exfoliated from a plastic container after consumption of contents at the time of recycling, a plastic container and a label are classified, plastic containers are collected, and it is related with the plastic container made reusable as a raw material etc. which manufacture a plastic.

[0002]
[Description of the Prior Art]In order to carry out seal preservation of a drink, a seasoning, foodstuffs, the cosmetics, etc. conventionally, various plastic containers, such as a bottle, a cup, and a tray, are used. And some of these contents deteriorate by invasion of oxygen from the outside. In the various conventional plastic containers to these problems, In order to give gas barrier property, a container wall is made into multilayer structure, and the resin composition which uses at least one layer of them for an ethylene-vinylalcohol copolymer, polyamide, etc., or blended the oxygen absorbent with thermoplastics is used. Metallic foils, such as aluminium foil, may be used for the composition of the container in a cup and a tray. However, if a container is made into the multilayer structure using a material of a different kind, a manufacturing cost will rise, and there is a problem that it is difficult to collect and classify a used container and to recycle it, and a manufacturing cost and recycling cost moreover become high.
[0003]In various plastic containers, in order to display contents, it is equipped with the label, but the gestalt has some etc. which stuck the tack label and the inmold label on a part of periphery of a wrap shrink label, a stretch label, or a container in the periphery of a container.

By giving gas barrier property to these labels, the proposal which protects contents from external oxygen is also made. However, in the plastic container which has the crevice 2 on the surface which is seen by drawing 1. When equipping the surface of the container 1 with the label 3, involving in air between the crevice 2 and a label is not avoided, but this involved-in air invades in a container from the container wall of a plastic container, and there is a problem of oxidizing the contents of a container and deteriorating them.

[0004]

[Problem(s) to be Solved by the Invention]The purpose of this invention is as follows.

Solve the characteristic problem in the label wearing plastic container which has a crevice on such the surface, and prevent deterioration of contents with the air from the outside and the air involved in between the crevice of a container surface and the label.

Provide the plastic container which exfoliates simply and can recycle a label by low cost from a used plastic container.

[0005]

[Means for Solving the Problem]This invention solves an aforementioned problem by taking the following composition.

1. Plastic container characterized by equipping with label which has gas-barrier-property resin layer and oxygen uptake nature resin layer provided in the inside so that this whole crevice of container surface may be covered at least in plastic container which has crevice on the surface.

2. Plastic container given in 1, wherein oxygen uptake nature resin layer is constituted with thermoplastics containing oxygen absorbent.

3. Plastic container given in 1, wherein oxygen uptake nature resin layer consists of resin which has oxygen uptake ability.

4. Plastic container given in either of 1-3, wherein label is multilayer-structure object which has oxygen uptake nature resin layer, gas-barrier-property resin layer, and surface protection layer.

5. Plastic container given in either of 1-4, wherein label is shrink label which has surface protection layer which has oxygen uptake nature resin layer, gas-barrier-property resin layer, and heat-sealing nature which have heat-sealing nature.

6. Plastic container given in either of 1-5 making adhesives layer intervene between label and container surface.

7. Plastic container given in 6 to which adhesive strength of label and adhesives is characterized by being larger than adhesive strength of container surface and adhesives.

8. Plastic container given in either of 1-7, wherein label forms peelable means.

9. Plastic container given in either of 1-8, wherein specific gravity of whole label is less than

one.

[0006]

[Embodiment of the Invention]In this invention, as a label with which the plastic container which has a crevice on the surface is equipped, it has a gas-barrier-property resin layer and the oxygen uptake nature resin layer provided in the inside, and the label which can exfoliate from a container after container use is used. While preventing oxygen from invading in a container from the exterior by using the label which has such composition by a gas-barrier-property resin layer, By absorbing the air involved in between the crevice of a container surface, and the label by the oxygen uptake nature resin layer of a label, contents are protected from oxygen, after use exfoliates a label from a container, and collects used containers, and it becomes possible to recycle as a raw material for plastic manufacture, etc.

[0007]In this invention, although there is no restriction in particular in the material which constitutes the plastic container which has a crevice on the surface, as desirable plastic material, polyolefines, such as polyester, such as polyethylene terephthalate, high density polyethylene, and polypropylene, are mentioned, for example. Constituting from plastic material of a monolayer is preferred on recycling, and as for a plastic container, when making it into multilayered constitution, it is preferred to consider it as lamination of plastic material of the same kind.

[0008]If the gestalt of the plastic container which has a crevice on the surface of this invention has sealing performance, there is no restriction in particular and it can be considered as a bottle, a cup, a tray, etc. Although restriction in particular does not have a molding method of a plastic container, either, it is usually carried out by biaxial stretching blow molding, direct blow molding, injection molding, vacuum forming, pressure forming, etc. The thickness of the kind of material or each part of a container which constitutes a container is chosen according to the kind etc. of contents stored inside the gestalt of a container, or a container. In the resin which constitutes a container, the usual combination drugs, such as colorant, stabilizer, an extender, lubricant, an antioxidant, and a spray for preventing static electricity, can be added if needed.

[0009]As thermoplastics which constitutes the gas-barrier-property resin layer of the label with which the plastic container which has a crevice on the surface is equipped, Although all publicly known things can be used, for example, an ethylene-vinylalcohol copolymer, polyamide, polyvinylidene chloride system resin, polyvinyl alcohol, a fluoro-resin, etc. are mentioned, It is preferred to use the resin which does not contain chlorine without a possibility of generating harmful gas at the time of incineration disposal. As desirable gas-barrier-property resin, more than 96 mol % and the copolymer saponification thing saponified and obtained so that it may become more than 99 mol % especially are especially mentioned [an ethylene content] for the degree of saponification 20-60-mol% in 25-50-mol the ethylene-vinylacetate copolymer which is %. As other desirable gas-barrier-property resin, the number of the amide

groups per 100 carbon numbers 5-50 pieces, Polyamide;, for example, nylon 6, which is in 6-20 ranges especially, nylon 6, 6, nylon 6/6, and 6 copolymer, metaxylylene adipamide (MXD6), nylon 6, 10, Nylon 11, Nylon 12, and nylon 13 grade are mentioned.

[0010]The oxygen uptake nature resin layer provided inside the gas-barrier-property resin layer of a label can be constituted by using the resin composition which blended the oxygen absorbent into the thermoplastics which does not have or have (2) oxygen-uptake nature, or (1) resin itself uses the resin which has oxygen uptake nature. both the thermoplastics which restriction in particular does not have as thermoplastics which constitutes an oxygen uptake nature resin composition (2), and has gas barrier property, and the thermoplastics which does not have gas barrier property -- although -- it can be used. When resin itself uses what has oxygen uptake nature or gas barrier property as thermoplastics which constitutes a resin composition (2), since invasion of oxygen inside a container can be effectively prevented with combination with the oxygen uptake effect by an oxygen absorbent, it is desirable.

[0011]As that in which resin itself has oxygen uptake nature, the thing using oxidation reaction of resin is mentioned, for example. The organic materials of an oxidizing quality, for example, polybutadiene, polyisoprene, polypropylene, The polyamide like an ethylene carbon monoxide copolymer, 6-nylon, 12-nylon, and meta-xylylene diamine (MX) nylon. What added a photosensitizer like the organic acid salt which are alike and contain transition metals, such as cobalt, rhodium, and copper, as an oxidation catalyst, and benzophenone, an acetophenone and chloroketone can be used. When such oxygen uptake materials are used, much more effect can also be made to reveal by irradiating with ultraviolet rays and a high energy beam like an electron beam.

[0012]There is no restriction in particular as thermoplastics which does not have gas barrier property, and each resin usually used for a label can be used. As desirable thermoplastics, for example Low -, inside -, or polyethylene of high-density, Eye SOTAKU tick polypropylene, ethylene propylene rubber, The polybutene 1, the polymethylpentene- 1, an ethylene-butene-1 copolymer, A propylene-butene-1 copolymer, an ethylene-propylene-butene-1 copolymer, Olefin system resin, such as an ethylene-vinylacetate copolymer, ion bridge construction olefine copolymers (ionomer), or such mixed material, can be mentioned, Thermoplastic polyester, polycarbonate, etc., such as polystyrene system resin, such as polystyrene, a styrene butadiene copolymer, a styrene isoprene copolymer, and ABS plastics, polyethylene terephthalate, polytetramethylene terephthalate, are mentioned. Each of these is independent or can be used as mixed material with other resin.

[0013]Although all the oxygen absorbents currently conventionally used for this kind of use can be used as an oxygen absorbent blended into these thermoplastics, By reduction nature, moreover, generally an insoluble thing is preferred to real waterworks, and to them as the suitable example, The metal powder which has reduction nature, for example, reducing iron,

reducing zinc, reducing tin powder; A metal lower order oxide, For example, FeO, Fe_3O_4; Reducing metallic compounds, for example, cementite, What used as the main ingredients what combined kinds, such as silicon iron, iron carbonyl, and ferrous hydroxide, or two sorts or more is mentioned, These can be used if needed, combining them also with hydroxide of an alkaline metal and alkaline-earth metals, carbonate, sulfite salt, thiosulfate salt, the third phosphate, the second phosphate, organic acid salt, a halogenide and also activated carbon, activated alumina, and an auxiliary agent like the activated clay. Or the high molecular compound which has polyhydric phenol in a skeleton, for example, polyhydric phenol content phenol aldehyde resin, the alpha-tocopherol or ascorbic acid, its salt, etc. are mentioned. As for these oxygen absorbents, generally, in order to secure transparence or a translucency, it is [mean particle diameter of 10 micrometers or less] preferred to have especially the particle diameter of 5 micrometers or less. Above resin itself may blend into thermoplastics by using as an oxygen absorbent the resin which has oxygen uptake nature.

[0014]As for the label used by this invention, in order to have a gas-barrier-property resin layer and the oxygen absorbent layer provided in the inside and to improve a printability etc., it is preferred to consider it as the multilayer-structure object in which the surface protection layer was formed on the surface of the label. The adhesives layer and the resin layer of further others which equip a container with a label by request can be provided in this multilayer-structure label. There is no restriction in particular as resin which constitutes the surface protection layer of a label, and each resin usually used for a label can be used. As such resin, the resin etc. which were illustrated above are mentioned as thermoplastics which does not have gas-barrier-property resin or gas barrier property, for example.

[0015]There is no restriction in particular as a gestalt of a label, for example, a tack label, a stretch label, a shrink label, etc. are mentioned. In order to prevent effectively invasion of oxygen to the plastic container equipped with a label, it constitutes so that the whole crevice of a container surface may be covered with a label at least. It is preferred to constitute so that not less than 80% of the total surface area of a package body may be covered with a label including the crevice of a container surface. In constituting the perimeter of a container drum part as a wrap shrink label, a label,Make into a inner layer the oxygen uptake nature resin layer which has heat-sealing nature, and a gas-barrier-property resin layer An interlayer, It is preferred to join by piling up and heat sealing the oxygen uptake nature resin layer (inner layer) of other side edges on the surface protection layer (outer layer) of one side edge of the multilayer-structure label which makes an outer layer the surface protection layer which has heat-sealing nature, and to constitute a cylindrical shrink label. In such a label, as compared with the shrink label only joined with adhesives or a solvent, it can become possible to reduce the level difference of a joined part substantially, and adhesion with a container can be raised.

[0016]There is no restriction in particular as resin which has such heat-sealing nature, and For

example, crystalline polypropylene, A crystalline propylene-ethylenic copolymer, the crystalline polybutene 1, the crystalline poly 4-methylpentene- 1, low -, Inside - or high density polyethylene, linear low density polyethylene, an ethylene-vinylacetate copolymer (EVA), Polyolefines, such as an ethylene-ethyl acrylate copolymer (EEA) and an ion bridge construction olefine copolymer (ionomer); Polystyrene, Aromatic vinyl copolymers, such as a styrene butadiene copolymer; Polyvinyl chloride, Vinylic halide polymers, such as vinylidene chloride resin; An acrylonitrile styrene copolymer, The nitrile polymer like an acrylonitrile styrene butadiene copolymer; Nylon 6, Nylon 66, Para, or polyamide; polyethylene terephthalate like metaxylylene adipamide, polyester [, such as polytetramethylene terephthalate,]; -- several kinds -- thermoplastics, such as polyacetals, such as polycarbonate; polyoxymethylene, can be mentioned.

[0017]As a desirable material, especially, for example Low density polyethylene, linear low density polyethylene, Medium density polyethylene, high density polyethylene, polypropylene, a propylene-ethylenic copolymer, olefin system resin, such as olefine resin by which graft denaturation was carried out with an ethylene-vinylacetate copolymer, ethylene system unsaturated carboxylic acid, or its anhydride, -- the polyamide of a low melting point thru/or a low softening point thru/or copoly amide resin, polyester, or copolyester resin is used comparatively. Especially, when polypropylene and low density polyethylene are used, the specific gravity as the whole label can be made into less than one, it exfoliates and a label is recycled from a used plastic container, since the gravity concentration by water becomes possible, it is desirable.

[0018]An adhesive resin layer can be made to intervene between each resin layer which constitutes a label if needed. As such adhesive resin, epoxy system resin, urethane system resin, polyethyleneimine system resin, acid denaturation polyolefin system resin, etc. are used. An adhesives layer can be made to intervene by request also between a label and a container surface. Such an adhesives layer may be selectively provided between a label and a container surface, and may be provided extensively.

[0019]Such an adhesives layer can be formed by forming by applying adhesives to a container surface, or providing an adhesives layer in the label inner layer surface. When a label is a gestalt of a shrink label, in order to prevent invasion of oxygen from a label end, it is preferred to form the adhesives layers 4 and 4 in the upper bed part and lower end part of the label 3 at ring shape, and to stick the label 3 and the container 1 so that drawing 3 may see. When a shrink label is what has a heat seal part, in order to prevent the blister in a joined part, and damage, it is preferred to apply adhesives to a container surface. It is preferred to form a glue line in the inner layer surface of a label beforehand in the label of gestalten other than a shrink label.

[0020]Each adhesives used for a label for such [usually] the purpose as adhesives made to

intervene between a label and a container surface by this invention can be used. As desirable adhesives, what added -COOH and a -NH_2 ingredient is mentioned to the hot melt adhesive, the olefin system rubber, or these which consist of acid denaturation polyolefine and ethylene-vinyl acetate system resin, for example.

[0021]After use, the plastic container of this invention strips a label, collects used containers, and is recycled as a raw material for various plastic manufactures, etc. Therefore, it is preferred to constitute so that a label may not peel but consumers can exfoliate a label easily from a container after use where contents are accommodated in a container.

[0022]The peel strength at the time of label wearing can be adjusted to the range of desired by choosing the material of the adhesives layer which equips a container with a label, for example, thickness, the conditions at the time of label wearing, etc. When exfoliating a label, in order to keep the adhesives made to intervene between a label and a container surface from remaining in a container surface, it is preferred to constitute so that the adhesive strength of a label and adhesives may become larger than the adhesive strength of a container surface and adhesives.

[0023]In order to make exfoliation of a label easy at the label used by this invention at the time of recycling, the peelable means of knob cost, perforations and a notch, having said that non-jointing etc. were provided in part can be formed in a label. When a label is a gestalt of a tack label, a stretch label, etc., while providing knob cost etc. in a label, it becomes still easier by adjusting the peel strength of a label to the specific range to exfoliate a label easily from a container at the time of recycling of a container.

[0024]As contents stored in the plastic container of this invention, various drinks, cooking oil, bean paste, instant noodles, various pouch-packed foods, a seasoning, cosmetics, etc. are mentioned, for example. When it is that in which contents deteriorate by light, the layer which blended an ultraviolet ray absorbent or paints with one or two or more layers of the label of the above-mentioned plastic container, or blended the above-mentioned ultraviolet ray absorbent and paints is added, and it may be made to give the interception nature to light.

[0025]

[Example]Although the example of this invention is described referring to drawings below, these examples do not limit this invention. Drawing 1 is a front view showing an example of the plastic container (bottle) of this invention, and drawing 2 is a type section figure showing an example of the label with which the plastic container of this invention is equipped. Drawing 3 is a front view showing other examples of the plastic container (bottle) of this invention.

(Example 1) By a biaxial-stretching-blow-molding method, 210 mm in height, the outer diameter of 66 mm, 528 cc of full injection inner capacity, and surface area are the crevices 2 (the surface area of a crevice) to the surface at 388-cm^2. The bottle 1 of the specific gravity

1.37 which comprises the polyethylene terephthalate (PET) which has 157-cm^2 in total was manufactured, and the inside was sealed after the nitrogen purge. After equipping the outside surface of the above-mentioned bottle 1 with the shrink label 3 from a bottle pars basilaris ossis occipitalis to the position of 170 mm of upper parts so that drawing 1 may see (about 80% of bottle surface products), the bottle with a label was obtained by making it contract by a hot wind.

[0026]In drawing 2 the shrink label 3 with which the bottle 1 was equipped, At 20 micrometers in thickness, polypropylene of specific gravity 0.9. At 13/of gas-barrier-property resin layer 3 micrometers in thickness which consist of an ethylene-vinylacetate copolymer saponification thing (EVOH) of specific gravity 1.19 at 12/of adhesive resin layer 20 micrometers in thickness which consist of acid denaturation polypropylene of specific gravity 0.9 at 11/of surface protection layer 3 micrometers in thickness which consist of (PP(s)), the acid denaturation of specific gravity 0.9. It has the multilayer structure which consists of the oxygen uptake nature resin layer 15 set to PP from the resin composition of the specific gravity 0.9 which added the oxygen absorbent at 14/of adhesive resin layer 20 micrometers in thickness which consist of polypropylene. The specific gravity as the whole of this label is 0.987.
When a used bottle is recycled, it is possible to exfoliate and to carry out gravity concentration of a bottle to the label with water or an alkaline-water penetrant remover.

[0027](Example 2) In drawing 2 at this example, 13/of gas-barrier-property resin layer thickness which consists of an ethylene-vinylacetate copolymer saponification thing (EVOH) of specific gravity 1.19 at 12/of adhesive resin layer 15 micrometers in thickness which consist of acid denaturation polypropylene of specific gravity 0.9 at 11/of surface protection layer 3 micrometers in thickness which consist of polystyrene of specific gravity 1.09 at 15 micrometers in thickness. Except having used for PP the shrink label 3 which has the multilayer structure which consists of the oxygen uptake nature resin layer 15 which consists of a resin composition of the specific gravity 0.9 which added the oxygen absorbent at 14/of adhesive resin layer 40 micrometers in thickness which consist of acid denaturation polypropylene of specific gravity 0.9 at 3 micrometers, The bottle 1 with a label was obtained like Example 1. The specific gravity as the whole of this label is 0.987.
When a used bottle is recycled, it is possible to exfoliate and to carry out gravity concentration of a bottle to the label with water or an alkaline-water penetrant remover.

[0028](Example 3) When equipping the surface of PET bottle 1 with the shrink label 3, By applying to ring shape the adhesives which become a position corresponding to the surface upper bed part and lower end part of the bottle 1 from polybutadiene and carboxylic acid components as shown in drawing 3, The bottle 1 with a label was obtained like Example 1

except having made the adhesives layers 4 and 4 intervene between the bottle 1 and the label 3.

[0029](Comparative example 1) The bottle 1 was obtained like Example 1 except not equipping with the label 3.

[0030](Comparative example 2) In Example 1, the bottle 1 with a label was obtained like Example 1 except having replaced with the oxygen uptake nature resin layer 15 of the label 3, and having used PP.

[0031](Oxygen translucency test) The bottle obtained in each above-mentioned example was sealed after the nitrogen purge, respectively, the oxygen density after two-week storage and in a bottle was measured on condition of 23 ** and 50%RH, and the quantity of the oxygen penetrated into a bottle was calculated. A result is shown in Table 1.

[0032]

[Table 1]

	ボトル内の酸素量（ｃｃ）
実施例１	０．２４
実施例２	０．２２
実施例３	０．０９
比較例１	１．１２
比較例２	０．６８

[0033]According to the above-mentioned table 1, each bottle obtained in Examples 1-3 of this invention had very little transmission quantity of oxygen into a bottle. On the other hand, in the bottle of the comparative example 1 which has not equipped with the label, and the bottle of the comparative example 2 equipped with the label which does not have an oxygen uptake nature resin layer, there was much transmission quantity of oxygen into a bottle.

[0034]

[Effect of the Invention]In this invention, the crevice of a container surface and deterioration of contents with the air involved in between labels can be efficiently prevented by low cost in the label wearing plastic container which has a crevice on the surface. Since it exfoliates simply and a label can be recycled from a used plastic container, practical value is very high.

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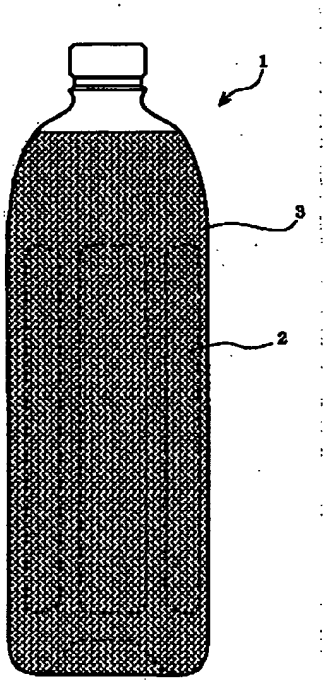
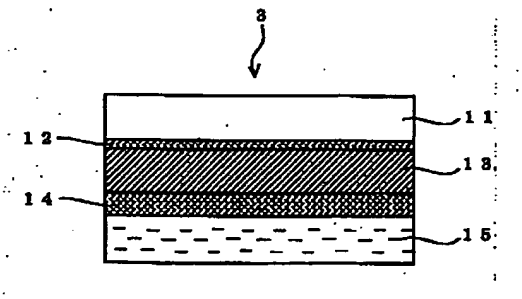
DRAWINGS

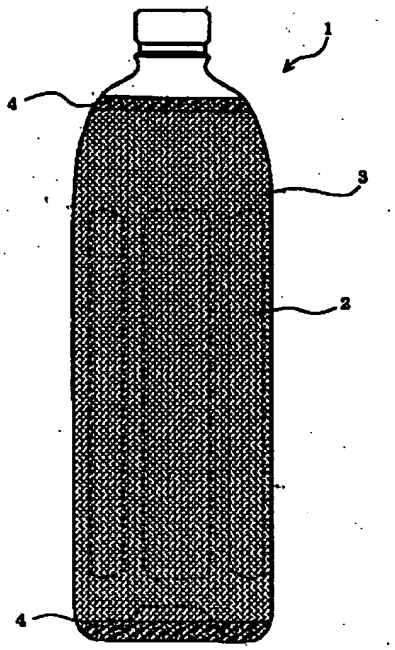
[Drawing 1]



[Drawing 2]



[Drawing 3]



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